



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,446	09/18/2003	Takatomo Nishino	09792909-5672	4529
26263 7590 03/31/2008 SONNENSCHN NATH & ROSENTHAL LLP P.O. BOX 061080 WACKER DRIVE STATION, SEARS TOWER CHICAGO, IL 60606-1080				
EXAMINER				
RUTHKOSKY, MARK				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
03/31/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/664,446

**Applicant(s)**

NISHINO ET AL.

**Examiner**

Mark Ruthkosky

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Priority***

Acknowledgment is made of applicant's claim for priority under 35 U.S.C. 119(a)-(d) based upon an application filed in Japan on 9/17/02. A claim for priority under 35 U.S.C. 119(a)-(d) cannot be based on said application, since the United States application was filed more than twelve months thereafter. Examiner points out that while the preliminary amendment filed on 9/18/03 has amended the specification to recite "priority under 35 U.S.C. 119 is not claimed", the declaration/oath filed on 3/8/04 does not indicate priority is not being claimed (box on page 2 is not checked). Appropriate correction is required. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claims Analysis***

Claims 1 and 7 recite the limitation, "effected by applying a compressive force and a shearing force to at least a part of a surface of a base material when the composite material is formed." This is a product-by-process limitation, which has been considered with regard to the structure of the product, but has not given patentable weight with regard to the process.

### ***Claim Rejections - 35 USC § 102***

Art Unit: 1795

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-12 are rejected under 35 U.S.C. 102(b)/103(a) as being anticipated by, and alternatively unpatentable over, Kawakami et al., US 6,432,585.

Kawakami teaches a battery comprising an anode, a cathode and an electrolyte. The anode comprises an anode structural body 10. The structural body comprises a host material 101 in an amount of 50 wt% or more. If the electrode structural body is used in a lithium battery, the host material comprises one or more elements selected from the group consisting of Si, Sn and In (11:1-18). When Si is used as the host material, Cu, Ni, Ag or Sn may partially cover the surface of the Si particles (11:30-67). Si may contain an impurity such as Al, Ca, Cr, Fe, Mg, Mn or Ni

to decrease the electric resistance of the electrode material layer 102 (12:1-5). The layer 102 may comprise the host material 101 and an electrically conductive auxiliary in order to assist and increase the electron conduction among particles of the host material or that between the host material and the collector. It is preferred the electrically conductive auxiliary be contained in an amount of 1-30 wt%. The electrically conductive auxiliary may be a carbonaceous material such as acetylene black, ketjen black or graphite. The electrically conductive auxiliary may be in a filament-like, fibrous or needle-like form. The host material and carbonaceous material are mechanically mixed using a ball mill or the like (compressive/shearing force) (12:46-13:9). See also column 19, line 50-column 20, line 23. See also Example 12.

Thus, the claims are anticipated. Kawakami does not explicitly state the host material and carbonaceous material are bonded by van der Waals forces. However, when the host material and carbon material are mechanically mixed using a ball mill or the like (compressive/shearing force), the host material and carbon material are inherently attracted by van der Waals forces (weak attractive forces acting between molecules; see Hawley's Condensed Chemical Dictionary, page 1217). In order for the carbon material to assist and increase the electron conduction among particles of the host material, the carbon material must be in contact with the host material.

Claims 1, 3-7 and 9-12 are rejected under 35 U.S.C. 102(b)/103(a) as being anticipated by, and alternatively unpatentable over, Suzuki et al., US 6,413,672.

Suzuki teaches a lithium battery comprising an anode, a cathode and an electrolyte. The anode comprises an anode material containing 50-99 wt% of silicon and 1-50 wt% of carbon material (abstract). It is preferable that silicon exists in the form of particles and the particles are

covered with the carbonaceous material. A material containing a high proportion of silicon provides a high capacity (2:52-67). An amount of 70 wt% or more of silicon is preferred (5:7-9). The carbonaceous material may be graphite, amorphous carbon (acetylene black) or a mixture thereof. For example, coke, natural graphite, artificial graphite, carbonized pitch or a mixture thereof may be used (5:16-22). Embodiment 1 teaches 28.5 parts by weight silicon and 7 parts by weight graphite were mixed and then processed in a vibration mill (compressive/shearing).

Thus the claims are anticipated. The carbon covering material is inherently bonded to the silicon by van der Waals forces (weak attractive forces acting between molecules; see Hawley's Condensed Chemical Dictionary, page 1217) when the material is subjected to a vibration mill.

Claims 1, 4, 5, 7, 10 and 11 are rejected under 35 U.S.C. 102(b)/103(a) as being anticipated by, and alternatively unpatentable over, Suzuki et al., US 6,171,725.

Suzuki teaches a battery comprising a positive electrode, a negative electrode and an electrolyte. The negative electrode includes a negative electrode material containing 30-90 wt% of silicon and 10-70 wt% of carbon (abstract). The carbon material may be cokes, graphite (artificial graphite) and the like (3:14-21). The silicon/carbon composite material preferably comprises 50-90 wt% silicon and 10-50 wt% carbon (3:22-63). Example 4 teaches silicon powder was mixed with graphite/pitch. After calcining, the solid material was roughly milled (compressed/sheared). Through dry milling, a silicon/carbon composite powder was obtained.

Thus the claims are anticipated. The teaching of a silicon/carbon composite material obtained by dry milling inherently teaches the limitation "physically bonded by van der Waals

forces". The teaching of a composite material clearly indicates the silicon and carbon materials are bonded.

Claims 1-12 are rejected under 35 U.S.C. 102(c)/103(a) as being anticipated by Inoue et al., US 6,506,520.

Inoue teaches a negative electrode for a nonaqueous secondary battery comprising composite particles (abstract). The composite particles include a core phase A and an outer phase B. When phase A is Sn, phase B may be Sn-Fe, Sn-Zn, Sn-In or Sn-Pb. When phase A is Si, phase B may be Si-Co, Si-Ni, Si-Zn or Si-Al (Table 1). A conductive material maybe contained in the negative electrode. Among conductive materials, synthetic (artificial) graphite, acetylene black and carbon fibers are especially favorable. The amount of conductive material in the negative electrode is preferably 1-30% of the negative electrode materials (composite particles) (5:50-6:3).

Thus the claims are anticipated. The claims are alternatively unpatentable because the courts have ruled that product-by-process limitations, in the absence of unexpected results are obvious. Inoue does not explicitly state a compressive and/or shearing force is applied to the negative electrode material, however, the negative electrode material of the claimed invention and the negative electrode of the prior art appear to be the same.

### ***Response to Arguments***

Applicant's arguments filed 1/2/2008 have been fully considered but they are not persuasive.

Applicant notes the discrepancy in the Declaration and states that Applicant will submit a new Declaration separately herefrom. No papers have been filed in response to this discrepancy.

Applicant argues that claims 1 and 7 do not include product-by-process limitations. This argument is not convincing. The limitation “effected by applying a compressive force and a shearing force” describes a process. The claim is to a product. The method steps including applying a compressive force and a shearing force have been considered with regard to the structure of the product, but are not given patentable weight. Thus, a compressive force and a shearing force are not required in the prior art.

Applicant further asserts, unlike the prior art, the claimed use of the compressive force and shearing action to combine the base material and the Group 14 element produces a composite material that is physically bonded by van der Waals forces. However, the claimed anode material must be shown to be materially different than the anode material of the applied prior art. Applicant has not provided any evidence clearly showing the claimed material is materially different than the prior art material. Applicant's asserted unexpected results do not properly compare the claimed invention with the prior art of record. The prior art teaches applying forces to the materials forming the claimed product.

Applicant states none of the cited references discloses or fairly suggest particles or a material resulting from the application of a compressive force and shearing action as claimed. However, this limitation is a product-by-process limitation, as noted, that is obvious in the absence of unexpected results. The claimed material and the material of the prior art are the same. MPEP 2112 (examiner note 1.d.) states, “When the reference teaches a product that appears to be the same as, or an obvious variant of, the product set forth in a product-by-process

claim although produced by a different process is properly rejected as anticipated under 35 U.S.C. 102 or in the alternative as obvious under 35 U.S.C. 103(a).

Furthermore, the mechanical mixing using a ball mill or the like of Kawakami results in compressive and shearing forces. The mixing in a vibration mill or roughly milling of Suzuki '672 or Suzuki '725 results in compressive and shearing forces. Examiner points out Figure 1 of the present specification as an example of the claimed compressive/shearing forces. Figure 1 uses a compressing bar, while the prior art employs ball mill using compressing balls. Applicant concludes the compressing bar of Figure 1 results in compressive/shearing forces. The compressing balls of the prior art provide equivalent forces that result in the same compressive/shearing forces. For these reasons, the claims stand rejected for reasons of record.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

***Examiner Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Mark Ruthkosky/  
Primary Examiner, Art Unit 1795